Oscillations in the regions of Evershed flows

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For local helioseismology it is necessary to have a detailed knowledge of oscillation characteristics in the sunspot, especially in its penumbra. We have investigated the line-of-sight velocity oscillations in penumbrae of several sunspots. Particular emphasis has been placed on the low-frequency portion of the spectrum (0.5-1.5 mHz). The measurements were made by the differential method which permits filtering of the wave motions with a given size and direction. Simultaneously at two height levels, NiI 4857 and H-β, measurements were made of the line-of-sight velocity difference in the radial direction of penumbra. Power spectra of time series exhibit in the range under consideration three groups of periods: 30-40, 12-15, and 8-10 minutes. We have used the height inversion of Evershed effect to identify the oscillations associated with Evershed flows, and to separate them from oscillations of a different origin. In addition to the 12-minute oscillations as detected by Rimmele the line-of-sight velocity component that is caused by Evershed motion is responsible for oscillations with periods of 15-35 minutes, which occur concurrently at the two height levels.